



Army Model Improvement Program & Simulation Technology Proposal for **AMSEC** 6 November 2000

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AGENDA

- **Background**
 - **Vision and Requirements**
 - **Discussion from last AMSEC**
 - **The Good news - We are making progress**
 - **There is a lot going on**
- **Comments from the Field**
 - **Key Stakeholders**
- **Assessment**
- **Summary**
- **Recommendations**
- **Conclusions**



The Army Vision:

Challenge: Solution Space is Complex

Solution impacts soldiers

Decisions are expensive

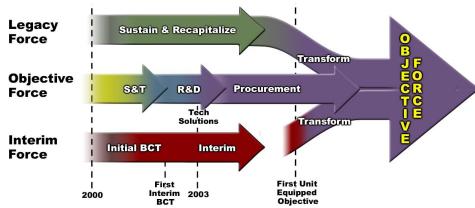
WARTIME MISSION

Evolving Force Requirements

*Asymmetrical Environment
with Asymmetrical Threats
Full Spectrum Challenges*

- Joint & Combined Ops
- SASO/Peacekeeping
- High Intensity Conflict
- Major Theater War

The Army Transformation



... Responsive, Deployable, Agile, Versatile, Lethal, Survivable, Sustainable.

FULL SPECTRUM

*Responsive
Deployable
Agile *
Versatile
Lethal **



FM 25-100/10

DOMINANCE

CSA Vision Speech
“Soldiers on point for the Nation transforming this, the most respected Army in the world, into a strategically responsive force that is dominant across the full spectrum of

Objective Force

- Lethal Small Units/Teams
- Adaptive Leaders & Soldiers



THE DIRECTION WE ARE HEADING

Increasing Reliance on M&S: TEMO, ACR, RDA



Types of Analysis (ACR and RDA)

Strategy, Strategic Environment, & Concept Studies

Force & Organization Design Studies

MNS & Materiel Operational Requirements

AoAs (Individual System Design or System of Systems)

FAA & BOS Analysis

Experimentation & Demonstrations

Lifecycle Cost & Resource Allocation

Training Strategies (Balance Between L-V-C, Embedd

M&S Supports:

- More insightful analysis
- Better trained:
soldiers, units & staffs
- Better system and organizational designs

Increased Combat Effectiveness



Last AMSEC 11 May 2000

- “Sir, I wish I could tell you that our M&S systems could *fully* answer the questions you are asking...
Questions such as: ***MOUT, IO, Logistics, Life Cycle Cost, SASO, FCS, Army Transition, QDR, FCS***, etc... Sir, they can’t”
- “Sir, I wish I could tell you we have adequate R&D and S&T programs to correct these problem areas.... Sir, we don’t”

Our operating environment is becoming more complicated...

- We are falling behind in functionality
- Can't fully support required analysis - complex issues
- We are not maximizing use of available technologies
- We are not adequately developing new technologies....
- Many ongoing efforts are not focused or meet critical needs



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More specifically,
our M&S Investment Plan
for Advanced Concepts
is not keeping pace
with future requirements

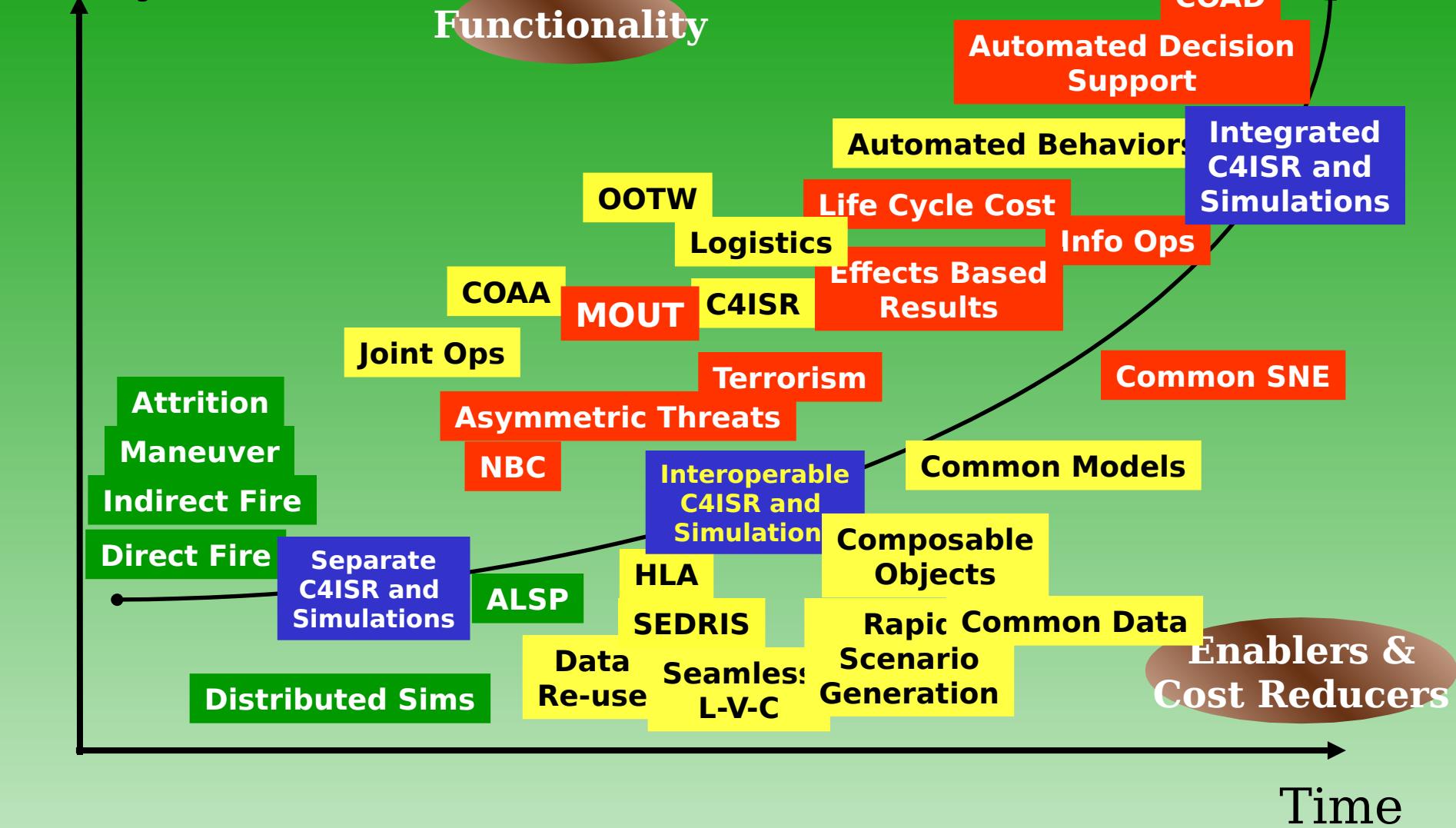


Much Has Been Done....

We Have Much Work to Do...

Functionality

Utility



Time



Much Has Been Done....

We Have Much Work to Do...

Utility

Functionality

Cognitive Behaviors

COAD

Automated Decision Support

Integrated C4ISR and Simulations

Automated Behaviors

Life Cycle Cost

Info Ops

Logistics

Effects Based Results

OOTW

COAA

MOUT

Joint Ops

Terrorism

Common SNE

Asymmetric Threats

Attrition

Maneuver

Indirect Fire

Direct Fire

Separate C4ISR and Simulations

Interoperable C4ISR and Simulation

Common Models

Composable Objects

Rapid Common Data

Enablers & Cost Reducers

ALSP

HLA

SEDRIS

Data Re-use

Seamless L-V-C

Distributed Sims

* Critically linked to Army Transformation Time

Address cost drivers

Leap-ahead capability



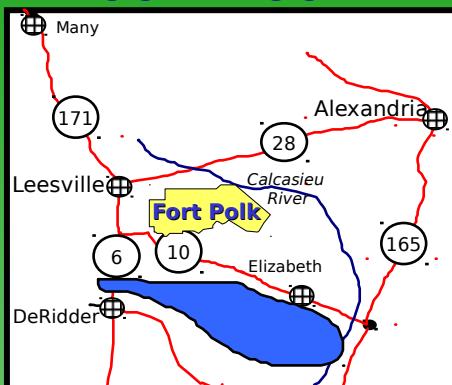
TRANSITION FROM STE TO LIVE

Division

Reconnaissance Fight
15 SEP (D+6) 1200Hrs
to 2000Hrs

JCF-AWE STE
Digital Environment

100 x 100 km Box

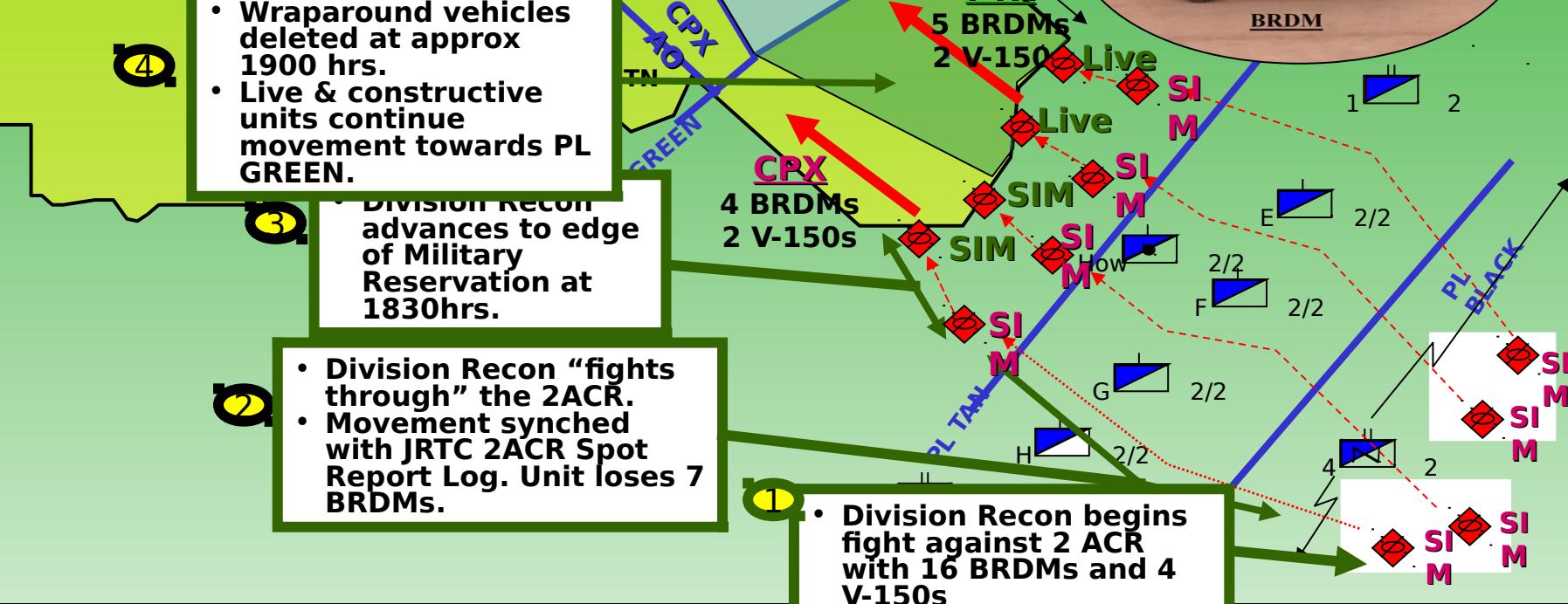


LIVE
BOX



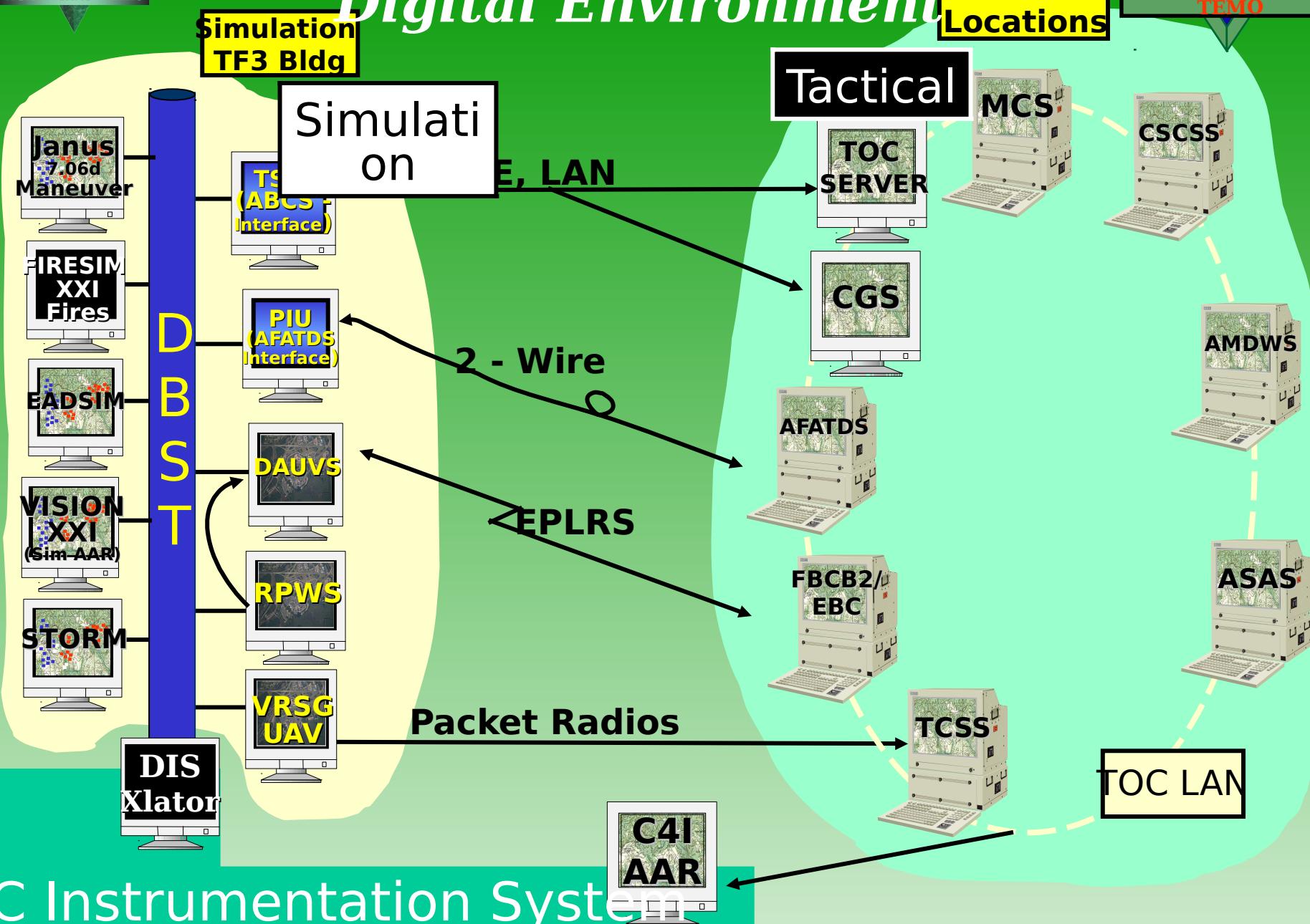
- Wraparound vehicles deleted at approx 1900 hrs.
- Live & constructive units continue movement towards PL GREEN.
- Division Recon advances to edge of Military Reservation at 1830hrs.
- Division Recon "fights through" the 2ACR.
Movement synched with JRTC 2ACR Spot Report Log. Unit loses 7 BRDMs.

- Division Recon begins fight against 2 ACR with 16 BRDMs and 4 V-150s





JCF-AWE STE Digital Environment





High Payoff Areas to Funded Project Crosswalk

- ◆ Expeditious and accurate generation of terrain data
 - ✓ Terrain Common Data Model
 - ✓ Co-Production/Update of CDM Data Sets
 - ✓ Automated Terrain Data Intensification
- Integration of real world C4I systems and simulations
 - ✓ Integrating C4I in COMBAT XXI
 - ✓ Simulation-C4I Module for Plans, Logistics, and Exercises
 - ✓ Army Standard Database Synchronization Model
- Standard methods and common requirements for data/scenario generation
 - ✓ Standard Data Exchange Methods
- Modeling to facilitate analysis of (joint) mobilization issues
 - ✓ Force Requirements Generator
- Integration of logistics within simulations
 - ✓ Force Requirements Generator
 - ✓ Logistics Federation
- Use of M&S to complement live testing
 - ✓ RDEC Federation
- Physics of failure
 - ✓ Mechanical PoF Demonstration and Life Cycle Methodology Development



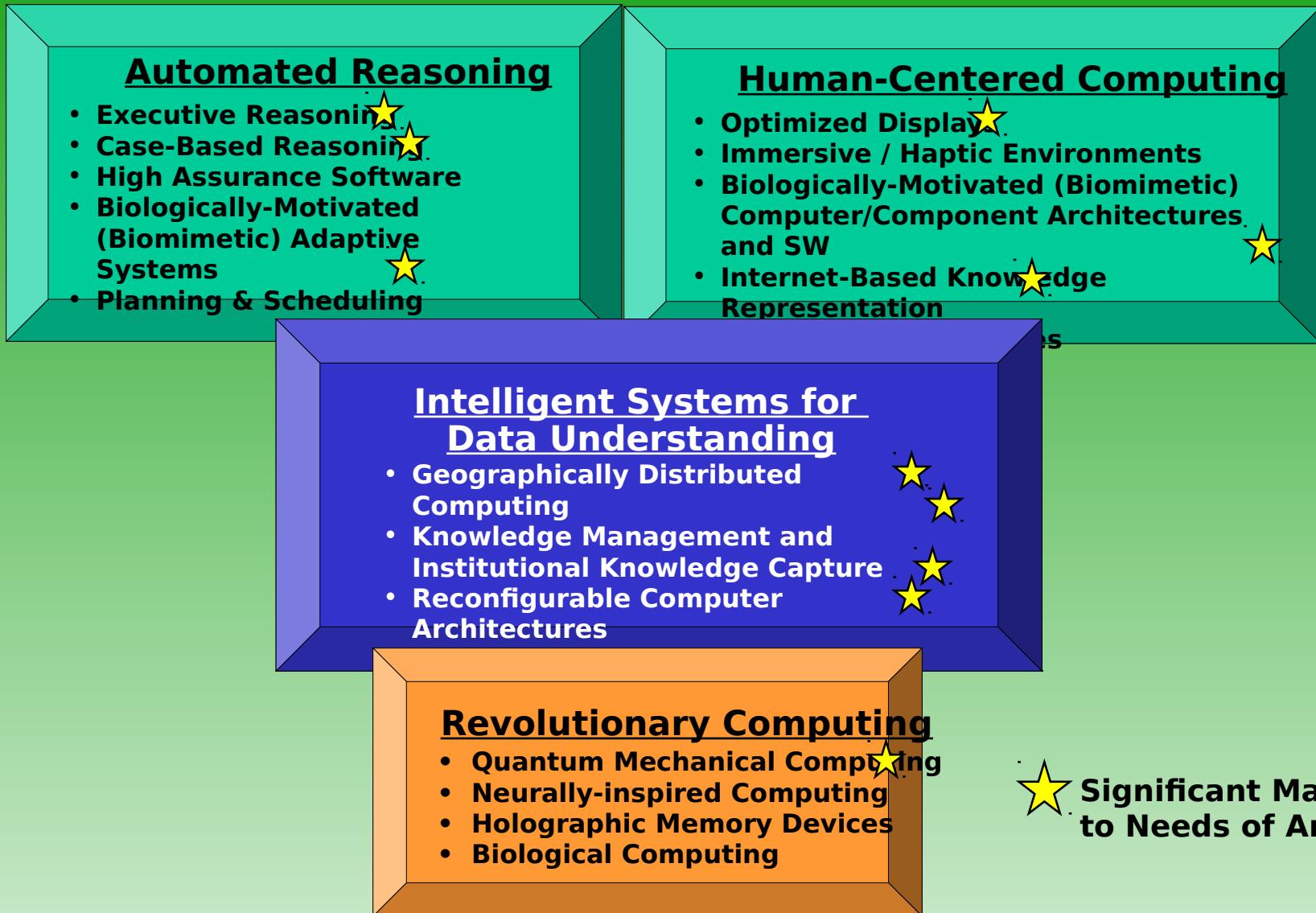
AMIP /SIMTECH

High Payoff AMIP Projects

- ◆ Active Protection (CASTFOREM) - AMSAA
- Upgrades to ATCOM - PM Comanche
- Standard Mobility Model Suite (NRMM) - ERDC-WES

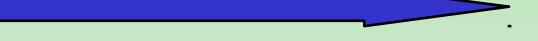


Major Investment Areas of NASA Intelligent Systems (IS) Program





Ongoing Efforts: "There is a lot going on"

- AMIP / SIMTECH 
- DMSO Warfighter Assessment (ID Warfighter Needs) 
- Institute For Creative Technologies (ICT) 
- Army S&T Master Plan 
- FCS 
- DARPA (CP XXI and Asymmetric Threat 
- STRICOM R&D Program (SNE STO) 
- University XXI 
- CECOM 
- Industry, Others.... 
- NASA 
- Battle Labs & RDECs 
- DMSO Integration Task Force 
- DMSO
 - Human Behavior Representation Program 
 - S&T Initiatives 
 - Integrated Natural Environment 
- Multi-Discipline University Research Initiatives (MDRI) 
- Army EDB IPT, Simulation-C4I Interoperability IPT 
- SMART



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Input from Stakeholders: Deficient M&S Areas: TEMO, ACR, RDA

- **MOUT:** PM FCS, TRAC, TRAC-W, TRADOC-CD, DCSOPS-TA, AMSAA, EUCOM
- **C4ISR (COAA):** PM FCS, CAA, TRAC, DCSOPS-TA, EUCOM, PACOM, NRC, USFK
- **Logistics:** PM FCS, TRAC-W, TRADOC-CD, DCSOPS-TA, AMSAA, CENTCOM, CASCOM, NRC
- **SSC (SASO, OOTW):** PM-FCS, CAA, TRAC-W, TRADOC-CD, DCSOPS-TA,

EUCOM, CENTCOM, PACOM, SOUTHCOM, DMSO

- **Composable Behaviors:** PM-FCS, TRAC, DCSOPS-TA, EUCOM, NRC
- **SNE:** PM FCS, CENTCOM, SOCOM, DMSO
- **Mobilization and Deployment:** PM FCS, DCSOPS-TA, CENTCOM, PACOM, TRANSCOM
- **ACR funding and Integrated Management:** PM FCS, TRAC, DCSOPS-TA
- **Reduced Cost:** EUCOM, CENTCOM, USFK
- **Concept Development for FCS:** TRADOC-DCG, DCSOPS-TA, NRC
- **Dismounted Infantry:** TRAC, AMSAA, EUCOM
- **Information Operations:** CAA, TRAC-W, DCSOPS-TA
- **Simulation - C4I Interoperability:** NSC, EUCOM, SPACECOM
- **Life Cycle Cost:** PM-FCS, AMSAA
- **M&S Architecture:** PM-FCS, DCSOPS-TA, NRC, NSC
- **Human Behaviors:** TRAC-W, EUCOM, DMSO

CINC Input:
DMSO Surveys with CINC Staffs



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Deficient M&S Areas: Current Path

Cursory Assessment for FY 03-07

Timeframe

- **MOUT: MOUT ACTD (Live Training), Data, Physics, and Behaviors, Scale**
- **C4ISR (COAA):** OneSAF, WARSIM
- **Logistics:**
- **SSC (SASO, OOTW): WARSIM, OneSAF**
- **Composable Behaviors:** OneSAF
- **SNE:** DMSO INE, Army EDB IPT, NIMA GI3 IPT
- **Mobilization and Deployment:** MOBSIM, JWARS
- **ACR funding and Integrated Management:**
- **Reduced Cost:** WARSIM
- **Concept Development for FCS: System of System Capability**
- **Dismounted Infantry:**
- **Information Operations:**
- **Simulation - C4I Interoperability:** DBST, OneSAF, WARSIM, SIM-C4I IPT
- **Life Cycle Cost:**
- **M&S Architecture:**
- **Human Behaviors:**
- **WMD:**
- **Common Data:** SNE (JWARS, JSIMS, OneSAF, CCTT, Cbt XXI),

Serious Problems
 Minor Problems
 Adequate Functional



Tactical UAV

Unmanned
Shooter
Platform

Robotic
Seeker

Robotic Sensor

Control Platform



Predicted Path based on current and projected capabilities:

- Simulate piece-parts only
- Little to no System-of-Systems synergy represented or analyzed
- Impacts of new logistics system and effectiveness not included
- No plan to develop C4ISR and M&S systems concurrently



M&S Architecture for ACR

Why Not?

**Today's System:
Data is Interpreted,
Translated, and
Shared**

**Little to no Inherent
Interoperability**

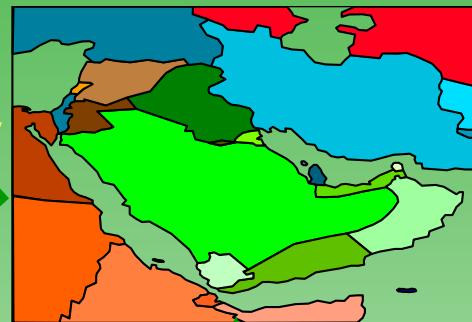
**Tactical-
CASTFOREM to CBT XXI
JANUS to OneSAF**



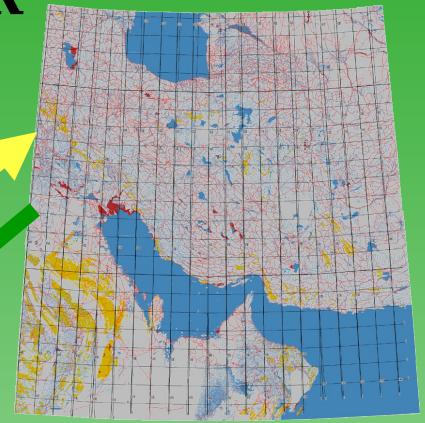
**Integrated / Interoperable
Systems are Key to Support:**

- Logistic Analysis
- Quantify Effects of C4ISR

**Operational-
EAGLE & VIC to
AWARS**



**Operational/Strategic
CEM to
JWARS**



Common Data: Models, Terrain, Algorithms, etc



Summary

- ↓ Ability to develop and assess advanced concepts is not keeping up with changing requirements (MOUT, Logistics, IO, LCC, etc..)
- ↓ Analytical tools being used to support FCS, Army Transformation, QDR, Joint Experimentation, Objective Force O&O (Specifically Logistics) are not adequate - Analyst and Subject Matter Experts filling the void
- ✓ Next generation of training simulations will address important issues (SIM-C\$I Interoperability, Joint Operations*, Overhead Cost)
- ↓ Next generation ACR models (AWARS, CBT XXI) not properly resourced
 - Resources to meet need are being taken out of hide
 - Current efforts - update current capabilities (OOP, HLA) vice new functionality
- Money, in and of itself, is not the problem
 - Many diverse efforts not prioritized or synchronized
 - AMIP/SIMTECH moving in right direction - requires more top-down focus
 - Major S&T funding (Army STO program) focused on approved systems - not analytical tools required to assess new concepts and Analysis of Alternatives which drive new systems requirements
 - C4I and M&S systems on parallel axis - not integrated
 - Areas such as MOUT, Logistics, IO, Automated Behaviors need long term plans supported with consistent and predictable 6.1, 6.2 or 6.3 efforts



Recommendations

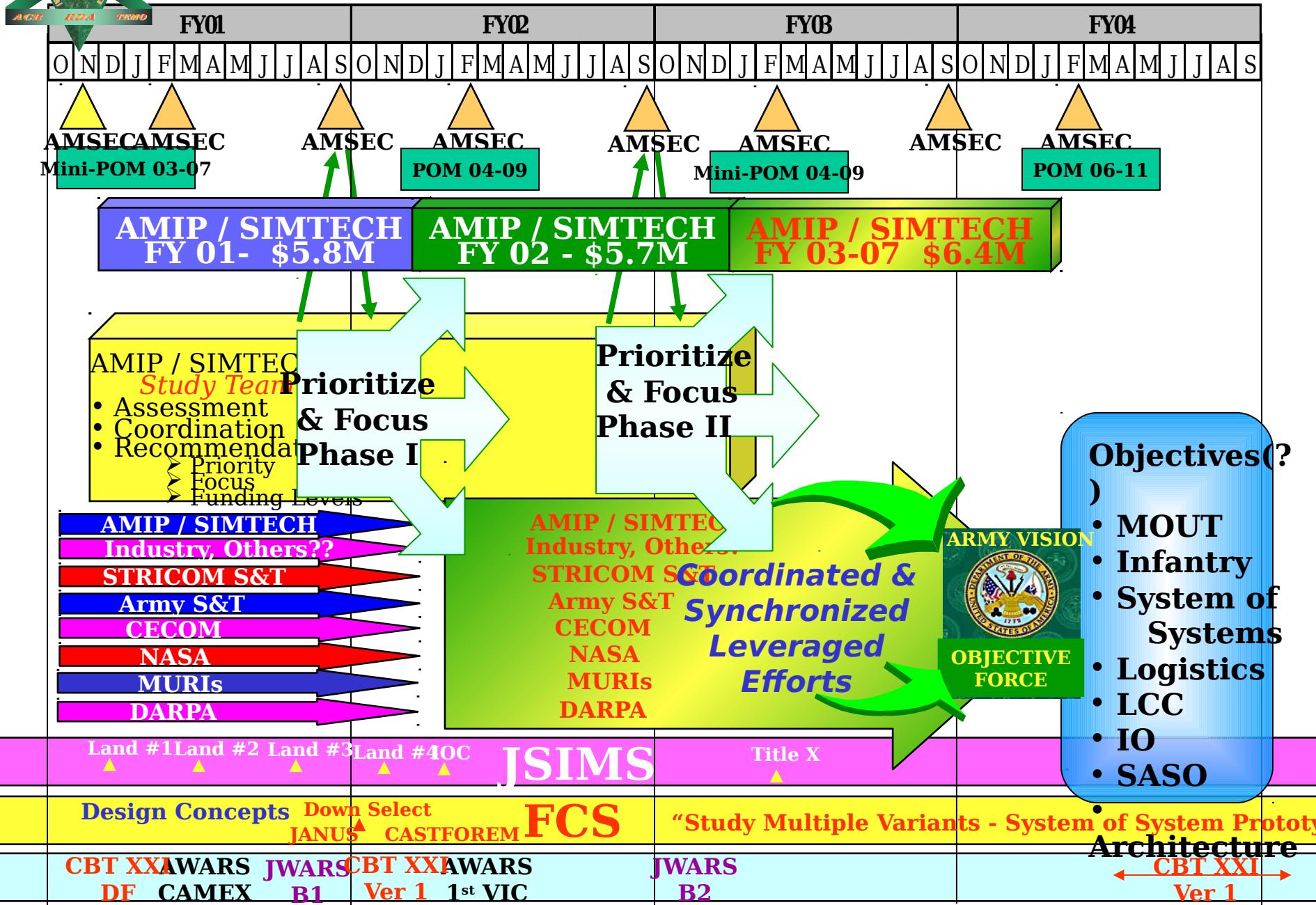
- Establish cross-domain multi-discipline Study Team to provide AMSEC with coordinated M&S investment strategy
 - Co-Chairs: AMSO and DASA(R&T)
- Explore Integrated Development of C4I and M&S systems
- Establish \$6.4M AMIP/SIMTECH funding level during Mini-POM 03-07

Strawman:

- TR \$4M (Increase \$.2M per Year 03-07)
- EE \$ 2.4M (Increase \$.4M per Year 03-07)
- Bill-payers identified as part of Mini-POM

Assumes following is funded by SMART Execution Plan:

- Task # 3.2.1 - \$2M / year for ACR model improvements
- Task 3.3.3 - \$1.6 M / year to fund SMART related AMIP/SIMTECH projects





Conclusion: "We must modify our S&T investment strategy..

M&S Derived Advanced Concepts and Analysis of Alternatives are prerequisite to obtaining cost-effective solutions"

Near-term: Relatively small, top-down-focused investment in:

- M&S Functionality: MOUT, LOGISTICS, IO, C4ISR, ETC....
- M&S and C4I Architectures
- Enablers:
- Cost Reducers: Common data and terrain

- Greater insights into new concepts
- More effective systems-of-systems
- More efficient logistics system – better understanding of risks
- Reduced life cycle cost (SMART)
- Plug and play
- C4I/MS Interoperability by design

*All critical for success of Army Transformation and FCS

- May be too late for full use
 - "You can't reap what you didn't sow"



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